FIG. 15 shows a process of determining the positions of the threshold Th at the next higher gradation and the threshold Tl at the next lower gradation when the dot pattern of a certain threshold Tfix has been determined in the threshold arrangement of a dither matrix, rather than halftone dots.

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Page 37, in the substitute specification please delete the 3rd first full paragraph and replace it with the following new paragraph:

The process shown in FIG. 16 includes steps S321, S323 - S325 (A step (1) corresponds to step S324, and a step (2) corresponds to step S325) which are identical to steps S21, S23 - S25 shown in FIG. 12, and steps S423 - S426 (A step (3) corresponds to step S424, and a step (4) corresponds to step S425) which are identical to steps S23 - S26 shown in FIG. 12. Therefore, these steps will not be described in detail below.

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<u>IN THE CLAIMS</u>:

Please enter the following amended claims:

1. (Twice Amended) A method of determining a threshold arrangement for generating a gradation image to determine a position of at least one threshold of the same value for a next gradation when positions of thresholds ranging from a smaller threshold to a threshold for a given gradation are determined in a threshold arrangement, comprising the steps of:

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(A) determining at least one candidate position for the position of at least one threshold of the same value for the next gradation; and

(B) determining the position of the threshold for the next gradation from said candidate position ,

said step (B) comprising the steps of:

extracting a low-frequency component from image data obtained based on the threshold arrangement in which the positions of the thresholds ranging to said threshold for the given gradation are determined (1st step);

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determining a low-frequency component intensity at said at least one candidate position (2nd step);

determining the candidate position where the determined low-frequency component intensity is weakest as the position of the threshold for the next gradation (3rd step); and

repeating said step of extracting a low-frequency component, said step of determining a low-frequency component intensity, and said step of determining the candidate position until all positions of at least one threshold of the same value for the next gradation are determined.

15. (Twice Amended)A method of determining a threshold arrangement for generating a gradation image to determine positions of thresholds for gradations higher and lower than a given gradation when a dot pattern for the given gradation is determined , comprising the steps of:

B11

determining positions of thresholds for higher gradations; and

determining positions of thresholds for lower gradations,

said step of determining positions of thresholds for higher gradations comprising the steps of:

(Aa) determining at least one candidate position for the position of at least one threshold (Th, having Tfix + 1 as an initial value) of the same value for the next gradation higher than the given gradation;

(Ba) determining the position of the threshold (Th) for the next gradation from said candidate position;

(Ca) updating the threshold (Th) with an increment thereof by 1 (Th + 1 → Th) and

repeating said steps (Aa), (Ba), and (Ca) until all positions of the thresholds for gradations higher than the given gradation are determined,

said step (Ba) comprising the steps of:

B11 (Bal) extracting a low-frequency component from image data obtained based on the threshold arrangement in which the positions of the threshold (Th-1) for the gradation are determined;

(Ba2) determining a low-frequency component intensity at said at least one candidate position;

(Ba3) determining the candidate position where the determined low-frequency component intensity is weakest as the position of the threshold (Th) for the next gradation; and

repeating said steps (Bal), (Ba2), and (Ba3) until all positions of said at least one threshold (Th) of the same value for the next gradation are determined,

said step of determining positions of thresholds for lower gradations comprising the steps of:

(Ab) determining at least one candidate position for the position of at least one threshold (Tl, having T_{fix} - 1 as an initial value) of the same value for the next gradation lower than the given gradation;

(Bb) determining the position of the threshold (Tl) for the next gradation from said candidate position;

B11

(Cb) updating the threshold (Tl) with a decrement thereof by 1 (Tl - 1 → Tl) and

repeating said steps (Ab), (Bb), and (Cb) until all positions of the thresholds for gradations lower than the

given gradation are determined,

said step (Bb) comprising the steps of:

(Bb1) extracting a low-frequency component from image data obtained based on the threshold arrangement in which the positions of the threshold (Tl + 1) for the gradation are determined;

(Bb2) determining a low-frequency component intensity at said at least one candidate position;

(Bb3) determining the candidate position where the determined low-frequency component intensity is strongest as the position of the threshold (Tl) for the next gradation; and

repeating said steps (Bb1), (Bb2), and (Bb3) until all positions of said at least one threshold (Tl) of the same value for the next gradation are determined.

REMARKS

Entry and consideration of this Amendment is respectfully requested. The amendments correct errors noted in the first preliminary amendment filed in the case.

Respectfully submitted,

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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The specification is changed as follows:

Page 8, in the substitute specification 1st full paragraph:

When a dot pattern for a certain gradation is determined, all the thresholds may be determined in the order of increasing magnitudes for lower gradations and in the order of decreasing magnitudes for higher gradations.

Page 8, in the substitute specification 2nd first full paragraph:

When the two dot patterns at a plurality of different gradations are determined, the positions of thresholds between different gradations may be determined in the order of increasing magnitudes from a threshold for the lower gradation and in the order of decreasing magnitudes from a threshold for the higher gradation.

Page 26, in the substitute specification 5th first full:

If the low-frequency component is weighted according to human visual characteristics and then extracted, the convolution process in a real space can also be used for the extraction instead of filtering in a frequency space as described above.

Page 31, in the substitute specification 2nd first full paragraph:

According to such a modification, in step S9 (third step) shown in FIG. 3, of the low-frequency component data L at the respective unwhitening pixel positions calculated in step S8, the position of a whitening candidate pixel ~~positions calculated in step S8, the position of a~~

~~whitening candidate pixel~~ whose value is greatest, ie., whose low-frequency component data power value is strongest or whose low-frequency component intensity is strongest, may be determined by the whitening pixel determining unit (corresponding to the blackening pixel determining unit 46 in FIG. 2) as a pixel to be whitened next (whitening pixel). In step S25 (second step) shown in FIG. 12, the position of a pixel whose low-frequency component data is greatest (strongest) may be determined as the position of a pixel to be whitened next.

Page 31, in the substitute specification 3rd first full paragraph:

In the meantime, only a certain dot arrangement (binary pattern, dot pattern, halftone dot configuration, white-and-black pattern) at a certain halftone percentage (a threshold for a certain gradation) may be chosen as the most suitable dot arrangement by a certain method. Even in such case, threshold arrangements can be determined as follows.

Page 32, in the substitute specification 1st first full paragraph:

FIG. 13 is illustrative of a process of determining the position of the threshold Th at a higher gradation and the position of the threshold Tl at a lower gradation when the dot pattern of the threshold Tfix for a certain gradation has been determined.

Page 32, in the substitute specification 2nd first full paragraph:

The process shown in FIG. 13 includes steps S31 - S41 (A process Aa corresponds to step S35, a process Ba1 corresponds to step S37, a process Ba2 corresponds to step S38, and a process Ba3 corresponds to step S39) which are identical to steps S1 - S11 shown in FIG. 3, and steps S45 - S51 (A process Ab corresponds to step S45, a process Bb1 corresponds to step S47, a process Bb2 corresponds to step S48, and a process Bb3 corresponds to step S49) which are

identical to steps S5 - S11 shown in FIG. 3. Therefore, these steps will not be described in detail below.

Page 36, in the substitute specification 3rd first full paragraph:

FIG. 15 shows a process of determining the positions of the threshold Th at the next higher gradation and the threshold Tl at the next lower gradation when the dot pattern of a certain threshold Tfix~~)~~ has been determined in the threshold arrangement of a dither matrix, rather than halftone dots.

Page 37, in the substitute specification 3rd first full paragraph:

The process shown in FIG. 16 includes steps S321, S323 - S325 (A step (1) corresponds to step S324, and a step (2) corresponds to step S325) which are identical to steps S21, S23 - S25 shown in FIG. 12, and steps S423 - S426 (A step (3) corresponds to ~~step S424, and a step (4) corresponds to step S425)~~ step S424, and a step (4) corresponds to step S425) which are identical to steps S23 - S26 shown in FIG. 12. Therefore, these steps will not be described in detail below.

IN THE CLAIMS:

Please enter the following amended claims:

1. (Twice Amended) A method of determining a threshold arrangement for generating a gradation image to determine a position of at

least one threshold of the same value for a next gradation when positions of thresholds ranging from a smaller threshold to a threshold for a given gradation are determined in a threshold arrangement, comprising the steps of:

(A) determining at least one candidate position for the position of at least one threshold of the same value for the next gradation; and

(B) determining the position of the threshold for the next gradation from said candidate position ,

said step (B) comprising the steps of:

extracting a low-frequency component from image data obtained based on the threshold arrangement in which the positions of the thresholds ranging to said threshold for the given gradation are determined (1st step);

determining a low-frequency component intensity at said at least one candidate position (2nd step);

determining the candidate position where the determined low-frequency component intensity is weakest as the position of the threshold for the next gradation (3rd step); and

repeating said step of extracting a low-frequency component, said step of determining a low-frequency component intensity, and said step of determining the candidate position until all positions of at least one threshold of the same value for the next gradation are determined.

15. (Twice Amended)A method of determining a threshold arrangement for generating a gradation image to determine positions of thresholds for gradations higher and lower than a given gradation when a dot pattern for the given gradation ~~are~~ is determined , comprising the steps of:

determining positions of thresholds for higher gradations; and

determining positions of thresholds for lower gradations,

said step of determining positions of thresholds for higher gradations comprising the steps of:

(Aa) determining at least one candidate position for the position of at least one threshold (Th, having Tfix + 1 as an initial value) of the same value for the next gradation higher than the given gradation;

(Ba) determining the position of the threshold (Th) for the next gradation from said candidate position;

(Ca) updating the threshold (Th) with an increment thereof by 1 (Th + 1 → Th) and

repeating said steps (Aa), (Ba), and (Ca) until all positions of the thresholds for gradations higher than the given gradation are determined,

said step (Ba) comprising the steps of:

(Bal) extracting a low-frequency component from image data obtained based on the threshold arrangement in which the positions of the threshold ~~(Th .1)~~ (Th-1) for the gradation are determined;

(Ba2) determining a low-frequency component intensity at said at least one candidate position;

(Ba3) determining the candidate position where the determined low-frequency component intensity is weakest as the position of the threshold (Th) for the next gradation; and

repeating said steps (Bal), (Ba2), and (Ba3) until all positions of said at least one threshold (Th) of the same value for the next gradation are determined,

said step of determining positions of thresholds for lower gradations comprising the steps of:

(Ab) determining at least one candidate position for the position of at least one threshold (Tl, having Tf ix . 1 as an initial value) of the same value for the next gradation lower than the given gradation;

(Bb) determining the position of the threshold (Tl) for the next gradation from said candidate position;

(Cb) updating the threshold (Tl) with a decrement thereof by 1 (Tl - 1 → Tl) and

repeating said steps (Ab), (Bb), and (Cb) until all positions of the thresholds for gradations lower than the

given gradation are determined,

said step (Bb) comprising the steps of:

(Bbl) extracting a low-frequency component from image data obtained based on the threshold arrangement in which the positions of the threshold (Tl + 1) for the gradation are determined;

(Bb2) determining a low-frequency component intensity at said at least one candidate position;

(Bb3) determining the candidate position where the determined low-frequency component intensity is strongest as the position of the threshold (Tl) for the next gradation; and

repeating said steps (Bbl), (Bb2), and (Bb3) until all positions of said at least one threshold (Tl) of the same value for the next gradation are determined.